THE NATIONAL FISHING AND AQUACULTURE

EXTENSION AND ADOPTION

STRATEGY

A component of
Working Together: the National Fishing and Aquaculture RD&E Strategy 2010

> *"The role of extension is to encourage adoption and innovation and turn R&D outputs into outcomes, such as practice or management change*."

1 June 2012

Prepared by the Fisheries and Aquaculture
Extension and Adoption Working Group

Introduction

On 23 April 2010, the Primary Industries Ministerial Council (PIMC) approved a National Strategy for Fishing and Aquaculture Research, Development and Extension (RD&E) which establishes the future direction to improve the focus, efficiency and effectiveness of RD&E to support Australia's fishing and aquaculture industry.

The Fishing and Aquaculture Extension and Adoption Working Group was established in October 2010. The purpose of the Working Group was to develop a *'Fisheries and Aquaculture Extension and Adoption Strategy'* (the Strategy) that would underpin and guide extension and adoption activities for stakeholders investing in fishing and aquaculture sector R&D. Following completion of the Strategy, the Working Group would then form the basis of a Fisheries and Aquaculture E&A Network. It is anticipated that the Network would include a broader range of participants and practitioners; maximising the effectiveness of the network.

The objective of the E&A Strategy is to improve the capacity for extension and achieve improved adoption rates in the Australian fishing and aquaculture sector to maximize RD&E outcomes for all.

The Strategy describes the framework for extension and adoption based on research and experience, highlighting the key factors that can help enable effective E&A. It is important to note that the Strategy does not assign responsibility to any particular organisation for the provision of an activity or service; it merely highlights the area and opportunity.

The starting point was to identify key players in Fisheries and Aquaculture E&A, and bring these people together to start the development of the Strategy. Given the diversity of people and organisations undertaking E&A activities across Australia, the groups below were identified to form membership for the working group. A full list of participants is located at Attachment 1.

- Australian fisheries management agencies (8)
- State fishing industry councils (8)
- National Aquaculture Council (1)
- Recfish Australia (1)
- OceanWatch/Seanet (2)
- Primary Industry Centre for Science Education (PICSE) (1)
- Seafood Services Australia (1)
- Marine Research Network (1)
- Seafood CRC (1)
- Marine Discovery Centres (1)
- Agri-Food Industry Skills Council (1)
- National Climate Change Adaption Research Adaptation Network (1)

A broad set of terms of reference were developed to underpin the group and the development of the National Fisheries and Aquaculture E&A Strategy. The first meeting of the group was held on 27 October 2010, with subsequent meetings held in March and July 2011 and March 2012.

Terms of Reference

1. Link and provide input into National Priorities and Research Forum
2. Develop guiding principles for extension and adoption (outlined below)
   - Base terminology
   - Stocktake – what is being done successfully and what is not
   - Research best practice (FRDC to undertake)
3. Ensure a national consistency of E&A activities.
4. Provide advisory role on E&A
   - Best practice
   - Link to other E&A Strategy/Activities (National PISC and Sector Strategies)
   - Collaboration
   - Identify and develop capacity building opportunities
5. Monitoring and evaluation. E&A needs to be evaluated to ensure ongoing success.
   - Baseline understanding and regular checking
   - Structured feedback to priorities forum/PISC

LIST OF PRINCIPLES AND RECOMMENDATIONS

(Detailed discussion of these principles and recommendations are set out in the main document)

PRINCIPLE 1: ALL STAKEHOLDERS TO VALUE EXTENSION AND ADOPTION ACTIVITIES IN THE SAME WAY AS RESEARCH ACTIVITIES.

Recommendation 1: All new research project applications are required to include planned extension pathways.

PRINCIPLE 2: EXTENSION WILL BE A KEY FOCUS IN RESEARCH PROJECT DEVELOPMENT

Recommendation 2: The approach taken by funders of fisheries research and development is examined with a view to implement structural changes that will increase their focus on extension activities.

PRINCIPLE 3: PROJECT KNOWLEDGE AND OUTPUTS ARE ACTIVELY MANAGED

Recommendation 3: A single website (or access point) be developed to store and find research and development outputs related to fisheries and the marine environment.

Recommendation 4: A stakeholder database is developed for (industry sectors, managers, researchers, media, etc.) to improve the targeted delivery fisheries research and development outputs and extension.

PRINCIPLE 4: EFFECTIVENESS AND IMPACT OF PROJECT EXTENSION ACTIVITIES ARE EVALUATED

Recommendation 5: A process is developed to monitor and evaluate extension and adoption activity.

Recommendation 6: An annual fisheries and aquaculture extension and adoption workshop be established.

PRINCIPLE 5: EXTENSION AND ADOPTION CAPACITY IS MAXIMISED AND BUILT UPON

Recommendation 7: That extension and adoption coordinators be employed and located in the three geographic regional hubs outlined in the National RD&E strategy.

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National Primary Industries RD&E Environment

During April 2005, the Primary Industries Ministerial Council (PIMC) endorsed the 'concept' of *national* research with *regional* development and ***local*** **extension**, recognising that research (both strategic and applied) can be provided from a distance, with regional adaptive development and local extension as critical support processes to ensure cost-effective innovation across the industry.

Subsequently, PIMC and the Research and Development Corporations (RDCs) signed a statement of intent containing a set of principles to facilitate further cooperation between agencies and industry to improve the efficiency and effectiveness of the National RD&E capability. The principles emphasised collaboration, information sharing, continuity of funding, access to capability and reporting.

During April 2007 PIMC agreed to further develop the concept through a National RD&E Framework to provide a more formal and comprehensive structured approach within an agreed timeframe. This framework aims to facilitate better collaboration and coordination between the Commonwealth, State Governments, CSIRO, universities, RDCs and industry.

A major driver for the National RD&E Framework is that RD&E resources are finite and there is a need to rationalise delivery to make RD&E more efficient and cost effective, while at the same time ensuring that gaps in capability are addressed to maximise strategic areas of need.

The National RD&E Framework spans 14 primary industry sectors, of which fishing and aquaculture is one and seven cross-industry sectors. The Primary Industries Standing Committee (PISC) was given the task to work with each sector to develop strategies and provide advice on sector specific areas.

Extension and Adoption is one area in which PISC established a specific national focus.

Founding Extension and Adoption Theory

The origin of extension is traced back to the 1500s (Jennings et. al. 2011). Over the ensuing centuries, up to the 1900s, extension was increasingly practiced in a range of forms, including: authorship and publications of various formats - such as leaflets, market reports, newspapers and books - as well as agricultural fairs, and training from formal training institutions such as schools, colleges, universities and research organisations.

In Australia extension efforts, starting in the late 1800s through to the post World War II, period largely took the form of publicly funded demonstration farms and related training centres, which were recognised as a critical component for lifting the national agricultural surpluses through the principle of teacher-student education.

At the core of extension and adoption is the concept of influencing an individual to change/alter something they do in an endeavour to achieve a better outcome.

The factors and mechanisms by which individuals arrive at the decision to change or alter their approach are numerous, varied and continue to evolve. They run along a continuum from the ***simple*** – a person seeing a problem and fixing it with their own knowledge and ingenuity perhaps within a vacuum to the outside world - through to the ***complex*** - a person taking time to initially build capability to understand and identify the concept/problem (need), moving through a range of phases including research, development, multiple touch points where the person may look to find information from different places, availability of the technology and legal capability to provide the solution.

The link between research, development, extension and adoption (RD&E) in agriculture and fisheries has been developed based on many years of theories of practice change, adult learning principles and new product development. *In reality extension starts once the 'problem' is identified and continues right throughout until either an answer is found or a solution is not forthcoming or be implemented.*

In general terms:

- An identified problem (issue/need) ***is the starting point for extension and adoption***.
- Research is identified and undertaken in response the problem.
- The development is undertaken in terms of commercialising the research
- The extension takes the R&D outputs and turns them into management or practice change.
- These are adopted through the implementation of various theories and models of (practice) change.

The above approach provides a simplistic model for an Extension and Adoption pathway – problem to solution.

FIGURE 1: ***Simple theoretical (linear) approach to research development extension and adoption process***

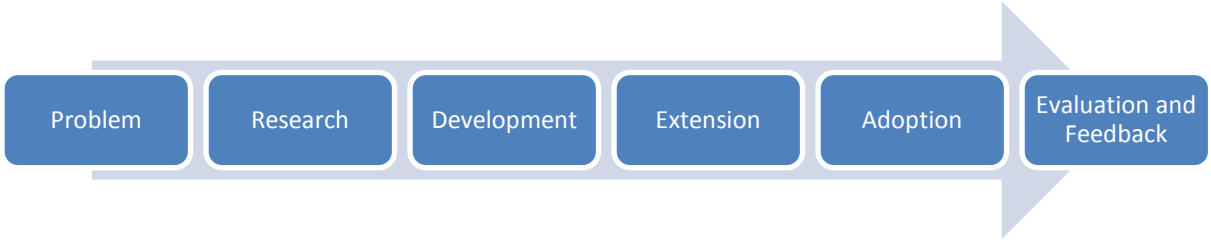
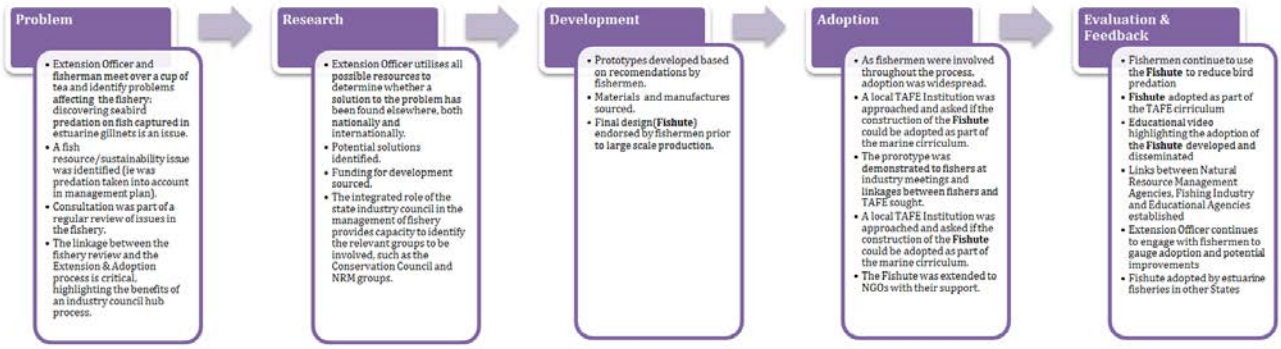


FIGURE 2: A linear example of successful E&A utilising extension officers in commercial fishing industry



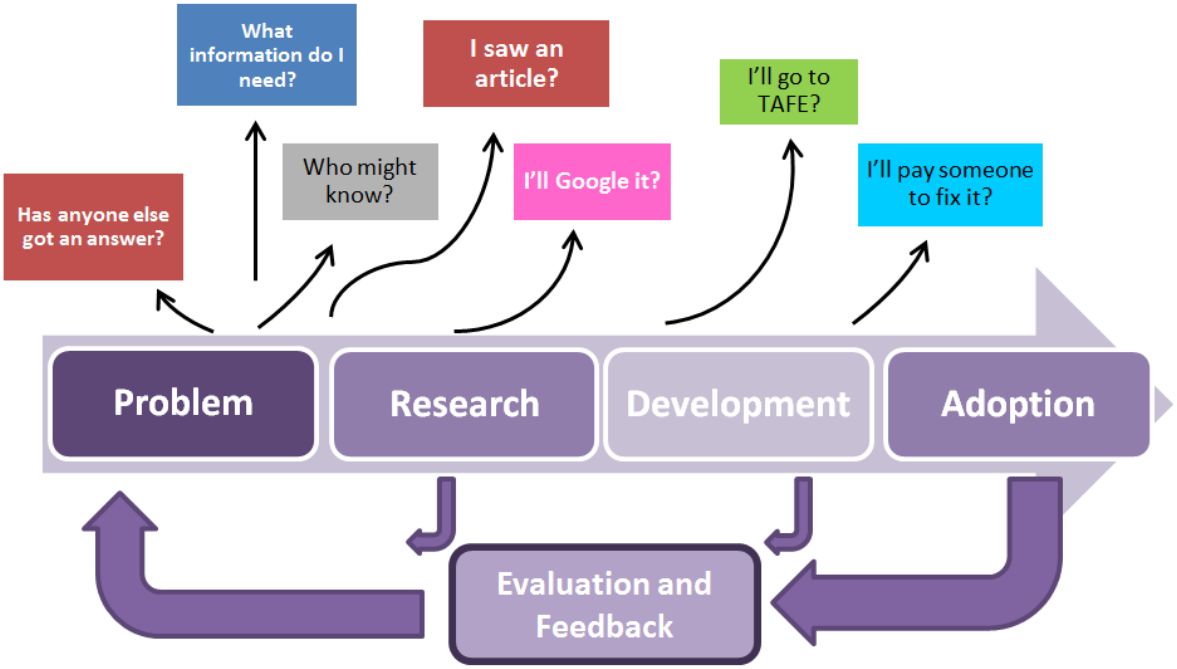
Modern Extension and Adoption

However, extension and adoption is much more complex and this approach does not apply to all situations. For example, where an answer has been discovered and management may want to have it applied to other areas or fisheries.

The process of going from research to adoption is often cyclical in that research produces more research questions. In addition, there are times when research results progress to the development stage, but the researchers have to go back to the drawing board to solve particular problems that have arisen when the results are tested.

In addition, in the above example extension starts near the end of the process, but in reality it starts once the 'problem' is identified and continues right throughout until either an answer is found or a solution is not forthcoming or can be implemented – as is seen in the below example.

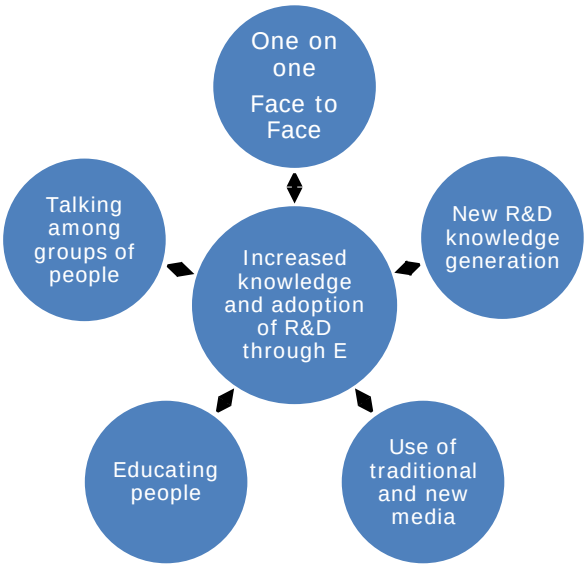
Figure 3: *problem solving (non-linear) approach to research development extension and adoption process*



Models of Extension

Extension activities can generally be categorised under five models that were identified by Dr Jeff Coutts (Coutts, 1997; Coutts *et. al.* 2005, Jennings Et al 2011) that contribute to capacity building. For any given problem multiple models and activities may be used. The models can interact to complement and enhance the achievement of each other's objectives. This conceptual framework of extension models is applicable to all contexts of extension and engagement, each with varying goals, activities and mechanisms of enabling change.

Figure 4: *primary models for transferring R&D outputs*



The models describe extension activities that go from intensive one on one (face-to-face) mentoring to accessing information remotely via media such as websites. The diagram below represents the models on this continuum of intensive interaction to remote access.

Figure 5: *models on an extension continuum from intensive to remote interaction*

National Extension and Adoption Environment

At the national E&A level, the following principles of extension and adoption were established and endorsed. These principals are designed to be the basis for each industry sector to apply as part of developing their specific industry E&A strategies.

National Extension Principles

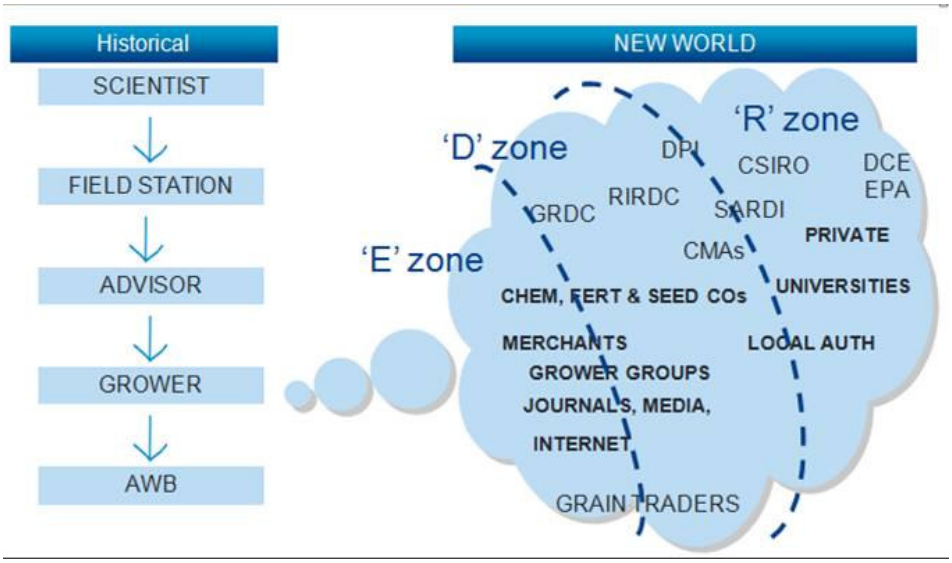
- All national strategies should include extension strategies that are considered as part of the research planning and investment process, and coordinated and monitored on a national basis so that national, regional and local issues and priorities are considered.
- It is a responsibility of all R&D investors *(i.e. any agency that contributes resources to RD&E)* to ensure that extension is identified, planned and able to be implemented, regardless of who invests in or undertakes the extension.
- Jurisdictions taking a Lead or Support role under the National RD&E Framework should ensure all other jurisdictions have high levels of access to R&D information and knowledge as needed.
- All levy payers should have access to RD&E information and knowledge generated from their levies.
- Public investment in RD&E should result in public access to RD&E information and knowledge generated from their investment.
- Extension strategies should provide the opportunity for input into strategic directions by clients and investors, including delivery agents.
- Industry/Government investment in RD&E should reflect where the best value for money is regardless if it is R, D or E, noting the need for a balanced portfolio and the risks associated with R&D *(from blue sky to basic research)*
- Government investment in R, D or E should not crowd out the role of private providers. However, where there is market failure and priorities are to be addressed there is a role for government investment

PISC agencies and Rural RDCs should work together to maximise opportunities for sharing information and knowledge that will assist in achieving national RD&E outcomes. In this context, the National RD&E Framework recognises that:

- all clients in the primary industries value chains require high levels of access to R&D information and knowledge which is relevant, up to date, understandable and provides a pathway to adoption;
- growing the capability of both practitioners and clients is critical to improving the success of extension;
- no single model of extension fits all and extension activities should be tailored to the target audience, often through a variety of methods and delivery channels, including commercialisation; and
- effective extension takes a significant amount of time and resources

The extension 'environment' has changed rapidly in the last two decades (see Figure 5). In particular, there is significantly reduced emphasis on a linear extension model (i.e. from scientist to farmer) to a complex, iterative, multiplayer and multi partnership model.

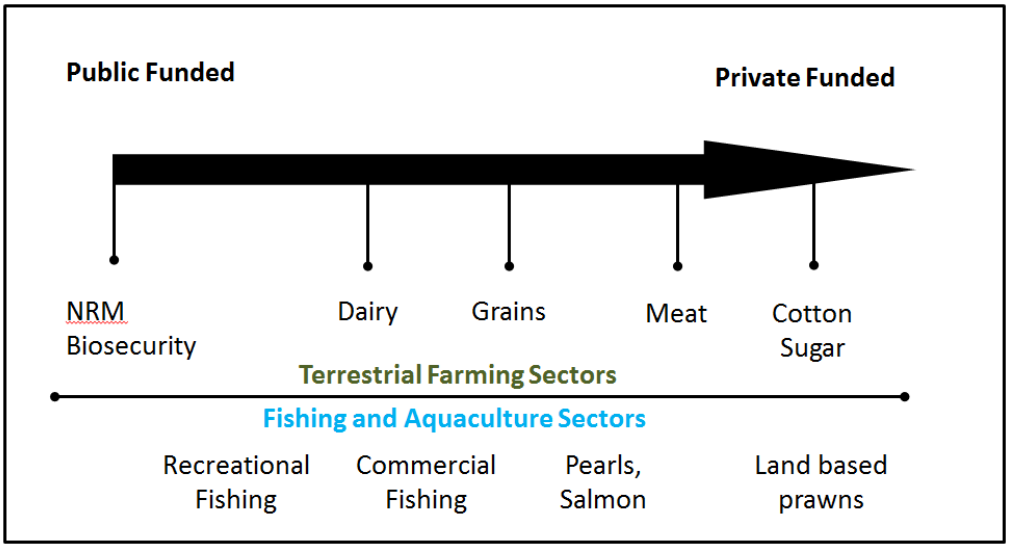
FIGURE 6: ***the historical and new world extension models – an example from the Grains RD&E Strategy (2010).***



At the National PISC Extension and Adoption workshop, held in Melbourne 2011, Dr. Bruce Kefford (PISC RD&E Committee Secretariat) outlined that the extension environment is continuing to evolve. The total public (Government) investment in extension through state agencies is reducing; this has led to a *'split'* between private sector investment (where private benefits dominate), and the public good interests (where there is usually market failure and industry has less incentive to invest). This continuing transition will occur over many years, at different rates for different agencies and different sectors. The following three points summarise the current state of E&A and funding split between private and public benefit.

- Public-good activities remain a primary responsibility for DPIs/Government
- Industry-good activities are (increasingly) co-funded by industry bodies and DPIs/Government
- Private-good activities are (increasingly) undertaken on a user-pays basis

FIGURE 7: ***template for resource deployment – private to public funded benefits***
(adapted from MLA presentation - extension co-investment principles (May 2010 #2))



National Strategy for Fishing and Aquaculture RD&E

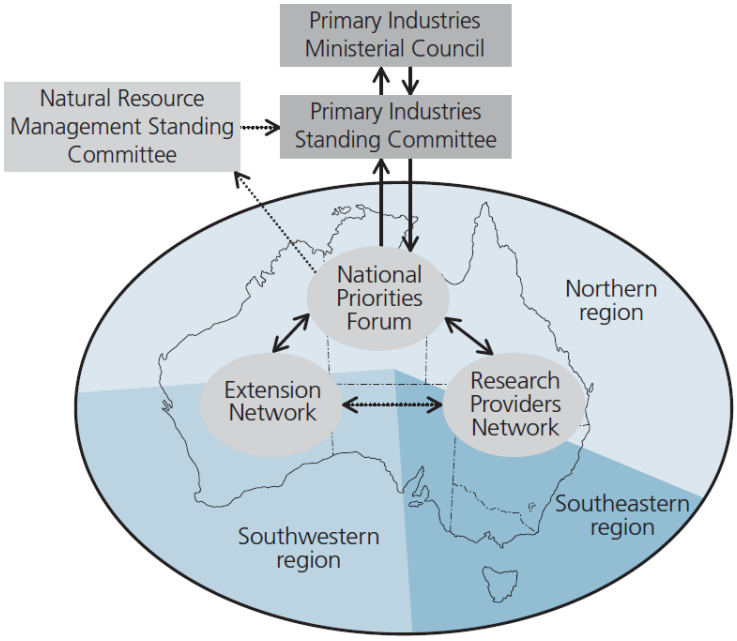
The Foundation for the Extension and Adoption Strategy

On 23 April 2010, the Primary Industries Ministerial Council (PIMC) approved a National Strategy for Fishing and Aquaculture RD&E (RD&E Strategy) that establishes the future direction to improve the focus, efficiency and effectiveness of RD&E to support Australia's fishing and aquaculture industry. The RD&E Strategy is available on line at http://www.frdc.com.au/research/national-framework)

The National Fishing & Aquaculture RD&E Strategy has established the **National Priorities Forum** to coordinate priority setting and advance the arrangements for RD&E activities across the country. Two sub groups have also been established to assist the National Priorities Forum on specific matters:

- **Research Providers Network**
- **Extension and Adoption Network**

FIGURE 8: key structures to deliver and monitor the National Fishing and Aquaculture RD&E Strategy



- **National Priorities Forum**

  The role of the National Priority Forum is to:

  - Set and review national RD&E priorities to ensure the strategy remains relevant to stakeholders
  - Seek alignment / intersection of priorities among stakeholders
  - Negotiate and consult on agreed Major-Support-Link positions for each jurisdiction
  - Negotiate on capacity and RD&E investment decisions to deliver on national RD&E plan
  - Foster existing and encourage new alliances and partnerships (national and regional)
  - Support national and regional collaborative processes for planning, consultation, funding and delivery of RD&E
  - Drive research concepts to address National RD&E plan themes

  The National Priorities Forum reports to Primary Industries Standing Committee / Primary Industries Ministerial Council.

- **Research Providers Network**

  The role of the Research Providers Network is to:

  - Negotiate on capacity and infrastructure investment decisions to deliver on national RD&E plan
  - Establish international linkages
  - Determine the research needed and develop research concepts to address themes of the national RD&E plan
  - Seek opportunities to improve extension and adoption of research outcomes

  The Research Providers Network reports to the National Priorities Forum

- **Extension and Adoption Network**

  The role of the Extension and Adoption Network is to:

  - Scan current and completed research and collaborate with FRDC and research providers to develop high-impact extension and adoption strategies
  - Deliver funded strategies
  - Identify opportunities to develop network capacity and skills of extension professionals
  - Provide advice and guidance to the FRDC People Development Program on development programs to support adoption outcomes

  The Extension and Adoption Network reports to National Priorities Forum.

Major – Support – Link

The National RD&E Strategy introduces the concept of Major, Support, and Link (M-S-L) roles for RD&E recognising that RD&E activities span a broad spectrum of areas and at present there is some duplication of efforts. Where appropriate, the M-S-L arrangements aim to reduce duplication, improve efficiencies and maintain key national capabilities. However it should be noted that while the M-S-L approach underpins the E&A Strategy it may not be entirely applicable across areas – primarily that some forms of extension need to be implemented at the local level and only a number of larger coordination and communication roles can be regional or nationally implemented.

Outlined below are some specific examples of current activities that are underway that can assist the reader understanding the concept of how Major-Support-Link could be implemented in fishing & aquaculture.

- **Major** – *an agency will take a lead national role by providing significant effort or resources into an area*.
  - Western Australia, having developed the 'MarineWaters' website for school educational material, could take a Major role.
  - Tasmania would be the logical state to take a Major role for the development of Atlantic Salmon RD&E.
- **Support** – *an agency will undertake some effort but other agencies will provide the major effort.*
  - University of Tasmania, having a strong Fisheries and Aquaculture research capacity, may support other lead states through the provision of research expertise.
  - Tasmania or Victoria may develop some specific school education material for their state fisheries and support WA via the provision of that material.
- **Link** – *an agency will access necessary information and resources from other agencies*.
  - A State may decide the material developed by WA for school educational material is all they need and may support the initiative by linking to it and promoting it via their networks.

It is important to acknowledge the diversity of organisations and the roles they play in the Fisheries and Aquaculture industry when discussing activities and looking to assign roles for Major-Support-Link (see Fig 4).

National Research – Regional Development – Local Extension

A key focus of the E&A Strategy is the continuation of the concept of National R (basic and strategic research (R) provided from a distance) with Regional D (adaptive development) and Local E (extension) to improve the uptake of innovation by industry.

To demonstrate this concept some examples are outlined below:

- National Research
  - University of Tasmania undertaking acoustics tagging research and the data having direct application to fisheries management across Australia.
  - CSIRO – undertaking work on Aquatic Animal Health issues.
- Regional Development
  - Fisheries Management is at the Regional level. It uses knowledge often developed elsewhere and extends that via management decisions specific to a fishery or region.
  - Eyre Regional Development Board running regional chef education programs with growers.
- Local Extension
  - Researchers working with industry trialling new gear technology developed elsewhere.
  - Fishers going to visit other fishers to see how they do an activity.

Extension and Adoption Models/Activities

Model and Description	Examples of Activities being undertaken ***at present*** in the fishing & aquaculture industry
One on one / Face to Face Individual Consultant/ Mentor This model is about individualised one-on-one support. It may be a technical expert visiting and providing advice, diagnosis and recommendations. It may be an on-going facilitating mentor relationship that provides a sounding board for decision-makers.	Extension officers • Oceanwatch/Seanet • Seafood Industry or Sector Bodies – WAFIC/TSIC/RecFishWest • Fisheries management agencies Specialist service providers – boat builders, net makers, processors,
Educating people *Programmed Learning* This model is about delivering specifically designed training programs/ workshops to targeted groups or community members to increase understanding or skills in defined areas. These can be delivered in a variety of modes and learning approaches.	Schools – primary, secondary, tertiary – non-standard online, indigenous, workbooks • Primary Industries Education Foundation (PIEF), Primary Industry Centre for Science Education (PICSE) Certification – skippers, engineers, forklift, etc • Agrifoods Skills Council – National Competencies Workshops and conferences Direct workplace training
New R&D knowledge generation *Technology Development* This is about working with individuals and groups to develop specific technologies, management practices or decision support systems that will then be available to the rest of the industry or community. It often involves local trials, demonstrations, field days and on-site visits.	Project based engagement of: • Researchers • Seafood Industry or Sector Bodies - WAFIC/TSIC/RecFishWest • Specific groups - Oceanwatch/Seanet
Talking among groups of people *Group Facilitation/ Empowerment* This focuses on increasing the capacity of participants in planning and decision-making and in seeking their own education/training needs based on their situation. The project will often provide or fund a facilitator to assist groups to define their own goals and learning needs and to help them realise these.	Seafood Industry or Sector Bodies – NSIA, Abalone Council, Regional groups – City Councils, Eyre Regional Development Board Slow Food Group Marine Discovery Centres Fishing Clubs Management Advisory Groups / Boards Trade, processing, retail chains NGOs, Port gatherings, species sector meetings (eg oysters) etc.
Use of traditional and new media *Information Access* This model is about providing a range of information that individuals and groups can access at a time that suits them. It can be based in a library, information centre, on a website, or other centralised location.	Media General – news, current affairs Media Specific Issue based – Fishing, Food, Environment • Print – fishing today, Ausmarine • Radio – Fishing shows; food market updates • TV – Escape with ET, Deadliest Catch, Masterchef etc. Libraries Government Communication – Licence/Management letters, Fish Magazine, Internet, Websites and electronic newsletters • Social Media – facebook, twitter, etc.

Evaluating current extension practices in Fishing & Aquaculture sector

Before starting to develop the E&A Strategy the E&A Working Group identified a need to understand and evaluate current extension practices in the Fishing & Aquaculture sector.

There was some disparity of views within the E&A Working Group as to what extent extension and adoption was being undertaken in Australia and how effective it was in meeting stakeholder needs. However, as a general overview the E&A Working Group agreed that in many situations (primarily Aquaculture) Australia was undertaking E&A well. However, there was no empirical evidence to substantiate this position.

To assist with establishing empirical evidence the E&A Working Group agreed to undertake basic research as a necessary first step to be able to make informed recommendations and for developing guiding principles.

Two research activities were undertaken to assess and gain a basic understanding of the current level of extension and adoption in the fishing industry. The two projects were:

1. An analysis by E&A Working Group members of some current E&A activities in their jurisdictions – See Attachment 3.

   E&A Working Group members were all asked to identify and analyse an example where extension had been undertaken well. To assist in carrying out the evaluation an impact matrix and an assessment framework were developed. Four full assessments are included as examples for the E&A Strategy.

2. An independent study was commissioned to identify and document best practice examples of extension and adoption within the fishing and aquaculture industry.

   FRDC funded a project to undertake independent research to provide background on E&A activities and approaches that have been and are being used for the Australian fishing and aquaculture industry. Dr Jess Jennings, University of Western Sydney and Director of Rufus Jennings were engaged to undertake the project. The research highlighted some best practice case studies that had achieved high levels of extension and adoption (change of practice). *The project provided insight into what extension activities should form the foundation for future planning and the approaches and activities that should be considered.* The full report (Final Report - 2011/505) is available from the FRDC website.

The results from these studies have been used to inform and underpin the development of the strategy.

Extension in the Fishing and Aquaculture Industry

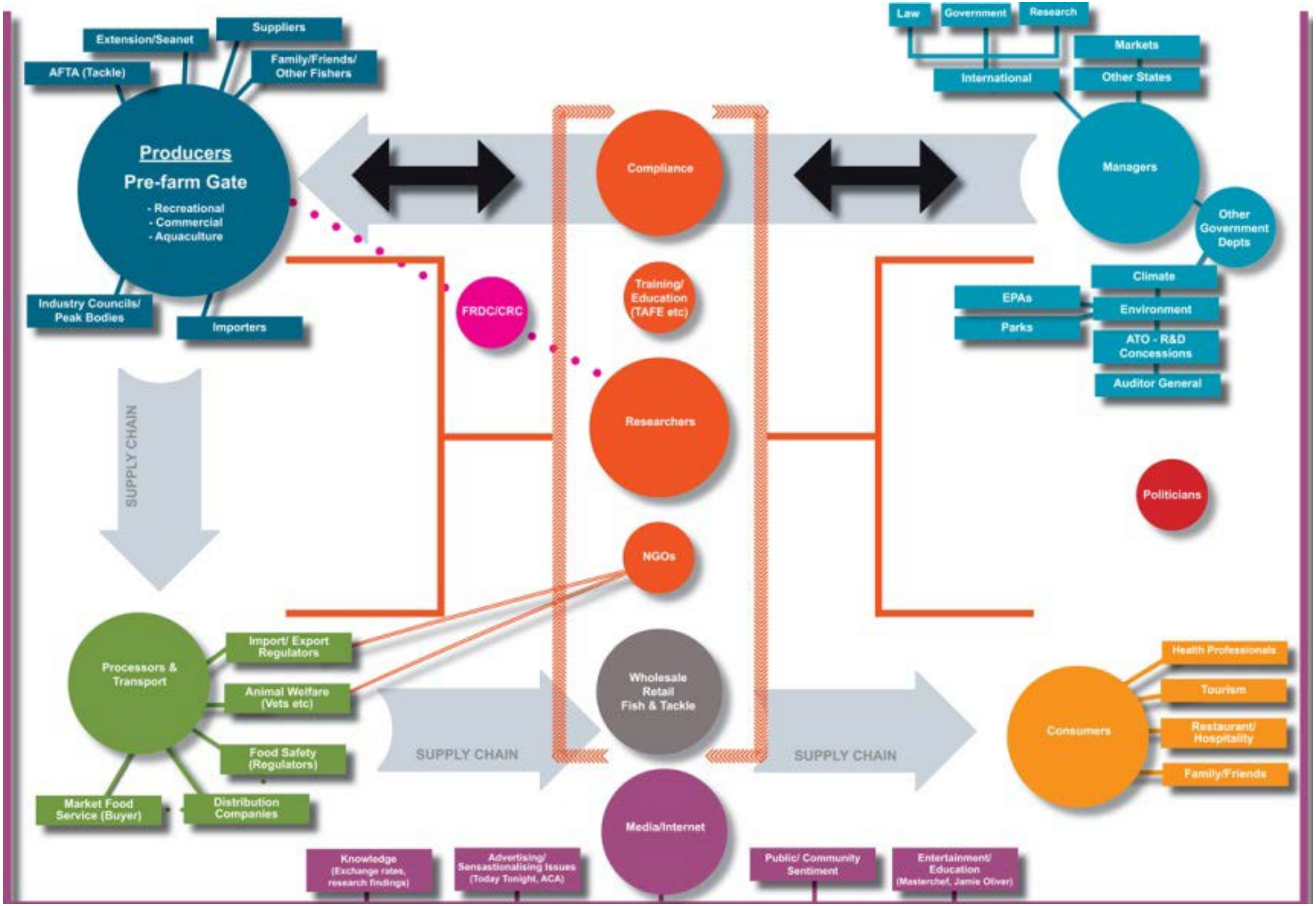
The fishing and aquaculture industry is characterised by its diversity of stakeholders and activities, geographic distribution, high number of species utilised, and by having both a Natural Resource Management (NRM) and primary industries basis for management and development respectively. The fishing and aquaculture industry comprises three main sectors: commercial (comprising wild-catch, aquaculture and post-harvest); recreational; and indigenous customary. These complexities have a significant bearing on RD&E priorities and investment processes.

At the second meeting of the Fisheries & Aquaculture E&A Working Group, members looked to identify the 'spectrum' of stakeholders to use as possible conduits or mechanisms for extension of information. The E&A Working Group found the spectrum contained five main segments:

- Producers – wild caught, aquaculture, importers, recreational.
- Transport/Processors/Support – freezing, trucking companies, packaging, tackle producers
- Consumers – retail, home, restaurant
- Management – fishery, environment, compliance, regional development
- Community – needing to understand activities and outcomes in fishing and aquaculture sector

The resulting flow diagram (on the next page) highlights the stakeholders along the fishing & aquaculture industry spectrum who are influential in disseminating knowledge to the various segments. In assessing across the segments it becomes apparent that there are a number of stakeholders that have connection with multiple segments along the spectrum – researchers, industry representative bodies, compliance officers, media, training providers and non-government organisations. These organisations due to their connection across multiple stakeholders may hold an advantage when coming to playing a role in extension and adoption.

Figure 5: *Extension players along the supply fishing industry supply chain*



Guiding Principles

The E&A Working Group developed the following guiding principles for all stakeholders to consider when undertaking extension activities.

PRINCIPLE 1: ALL STAKEHOLDERS TO VALUE EXTENSION AND ADOPTION ACTIVITIES IN THE SAME WAY AS RESEARCH ACTIVITIES.

> ***Recommendation 1: All new research project applications are required to include planned extension pathways.***

PRINCIPLE 2: EXTENSION WILL BE A KEY FOCUS IN RESEARCH PROJECT DEVELOPMENT

- particular focus on identifying end users during the development of applications – use of E&A Matrix.
- aim for ongoing engagement with end users during a project.
- projects should focus on the desired outcome rather than the outputs.
- demonstrated capacity of extension in applications – identify stakeholders/resources tools/expertise for activities.

Research and development projects make up a large part of the knowledge that is generated in Australia each year. The projects usually focus on answering a specific problem or question. Generally extension is done during or as a separate activity following the completion of the project.

Development of Projects

Research is funded from many sources. The development of the project proposals and what is required to be included varies between the funding sources. In some cases extension is required to be part of the proposal. However, this does not mean that extension is embedded into the project design.

For example, the FRDC has established a Fisheries Research Advisory Body to assist oversee development and prioritisation of R&D applications in each jurisdiction. The FRDC also requires that all applications include an extension component. However the FRABs do not assess the extension component as part of the initial assessment; nor do they undertake any activity in the actual extension of the project once it is approved and commenced. Given the FRABs role is to assist with the development and prioritisation of applications, there is an opportunity to expand their role by increasing the focus on extension – this would include identifying areas (issues) that require R&D investment.

> ***Recommendation 2: The approach taken by funders of fisheries research and development is examined with a view to implement structural changes that will increase their focus on extension activities.***

During the Project

It is no longer acceptable for research to be carried out in isolation with little regard to the end user. The core purpose of any R&D activity is to create knowledge and answers to problems.

Research undertaken for the FRDC on Extension and Adoption in the Fishing and Aquaculture Industry has shown that E&A undertaken during the project is much more effective. This requires the project manager to be aware of the need for extension and make a concerted effort to ensure that extension activities are undertaken.

Post Completion

For research projects that have been completed and there is an identified require further (dedicated) extension of the research outputs. This may require alternate or dedicated funding be available for top up or non-original target audience extension.

PRINCIPLE 3: PROJECT KNOWLEDGE AND OUTPUTS ARE ACTIVELY MANAGED

Over the past fifty years a large bank of fisheries knowledge has been developed. Some of this knowledge is readily accessible and is still being used. However, a lot is not. This is due to a number of issues – organisations ceasing to exist, records not being kept, or changes to technology and decisions made not to convert data. It is important that a long term legacy is created where knowledge generated is valued and built upon.

Information Technology is one area that can assist with building a legacy. A central fisheries research, development and extension repository linked to a stakeholder database would provide a mechanism to enable fast dissemination to the appropriate stakeholder. This would provide practitioners a first port of call to find out if knowledge existed on a certain subject. It would also allow for the direct distribution of research outputs to those industry members with a direct need or interest.

Recommendation 3: A single website (or access point) be developed to store and find research and development outputs related to fisheries and the marine environment.

Recommendation 4: A stakeholder database is developed for (industry sectors, managers, researchers, media, etc.) to improve the targeted delivery fisheries research and development outputs and extension.

International Knowledge

Globally there are a significant number of Fisheries and Aquaculture research and development activities underway. The vast quantum of knowledge and resources that are being developed provides many opportunities for all Australian fishing and aquaculture participants – from production down the supply chain to consumer; and manager to researcher alike. The biggest challenge is tapping into this knowledge and resources.

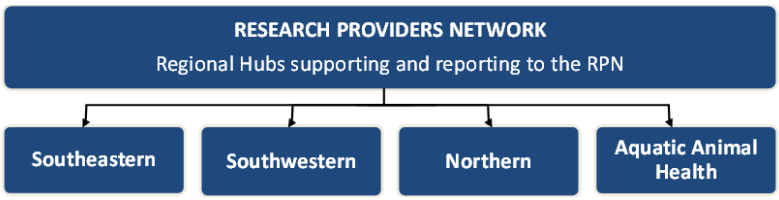
PRINCIPLE 4: EFFECTIVENESS AND IMPACT OF PROJECT EXTENSION ACTIVITIES ARE EVALUATED

Recommendation 5: A process is developed to monitor and evaluate extension and adoption activity.
Recommendation 6: An annual fisheries and aquaculture extension and adoption workshop be established.

PRINCIPLE 5: EXTENSION AND ADOPTION CAPACITY IS MAXIMISED AND BUILT UPON

There currently exists a large volume of fragmented capacity of extension officers in various guises. This capacity is not being fully harnessed because many practitioners have not developed networks and are not aware of what knowledge exists – so some are re-inventing the wheel. This is exacerbated because many of the extension positions are funded on short term contracts, so staff turnover regularly and the ability to build a network and bank of knowledge is reduced.

The Research Providers Network have agreed to the formation of four regional hubs (see below) to advise on the alignment of capacity, infrastructure and capability to deliver on the national RD&E plan at the regional or national level. Identify future research skills gaps and develop solutions to address knowledge gaps that may limit delivery of outcomes. Identify specific national/regional research programs to address priority themes and oversee governance arrangements necessary to ensure effective collaboration to deliver on research projects and review and report annually.



The framework of four regional hubs agreed to by the Research Providers Network provides a framework from which the Extension and Adoption Network could link into or build upon to provide not only guidance and priority setting for research project development, but also in improving the coordination of existing extension services.

Recommendation 6: That extension and adoption coordinators be located in the three geographic regional hubs outlined in the National RD&E strategy.

Abbreviations

AFTA	Australian Fishing Tackle Association
ATO	Australian Taxation Office
AWI	Australian Wool Innovation
AWRI	Australian Wine Research Institute
CRC	Cooperative Research Centre
CRDC	Cotton Research and Development Corporation
DA	Dairy Australia
DEEDI	Department of Employment, Economic Development and Innovation
EPA	Environmental Protection Agency
FRDC	Fisheries Research and Development Corporation
GWRDC	Grape and Wine Research and Development Corporation
I&I	Industry and Innovation
IDO	Industry Development Officer
MLA	Meat and Livestock Australia
NGO	Non-Government Organisation
NRM	Natural Resource Management
PIMC	Primary Industries Ministerial Council
PISC	Primary Industries Standing Committee
RD&E	Research, Development and Extension
RD&E Strategy	National Strategy for Fishing and Aquaculture Research, Development and Extension
RDCs	Research and Development Corporations
TSIC	Tasmanian Seafood Industry Council
WAFIC	Western Australian Fishing Industry Council
WFA	Wine Federation of Australia

Attachment 1

Working Group Members

The Fishing and Aquaculture Extension and Adoption Working Group was established in October 2010. The group consisted of twenty six organisational positions. During the development of E&A Strategy the following people assisted and provided input into the development of this strategy.

CHAIR	
Brett McCallum	Executive Officer, Pearl Producers Association
SECRETARIAT	
Peter Horvat	Fisheries Research and Development Corporation
Julie Haldane	Fisheries Research and Development Corporation
MEMBERS	
Philip Armato	Manager, Department of Primary Industries Victoria
Matt Barwick	Extension Officer, Recfish Research
Colin Bishop	Business Development, Seafood Services Australia
Clare Brooker	Coordinator, Marine Adaptation Network
Michael Burke	Manager, Western Australian Department of Fisheries
Russell Conway	Chair, Recfish Australia
Ian Curnow	Executive Director, Fisheries, Northern Territory Department of Resources
Pam Elliott	Chair, Marine Discovery Centres Australia
Doug Ferrell	Manager – Resource Management, NSW Department of Primary Industries
Andrew Goulstone	Director, Commercial Fisheries, NSW Department of Primary Industries
Graeme Hanel	Principal Regional Coordinator, Department of Primary Industries Victoria
Winston Harris	Chief Executive Officer, Queensland Seafood Industry Association
Jess Jennings	Director, Rufus Jennings
Pheroze Jungalwalla	Chair, National Aquaculture Council
Neil MacGuffie	Research Officer, Western Australian Fishing Industry Council
Trixi Madon	Chief Executive Officer, Commonwealth Fisheries Association
Emily Mantilla	Program Manager, Australian Seafood CR
Ross McGowan	Executive Director, Seafood Industry Victoria
Gary Morgan	Chair, Wildfish South Australia
Julie Murphy	Marine Education Officer, Department of Primary Industries Victoria
Lowri Pryce	Executive Officer, OceanWatch Australia
Andrew Rowland	Chief Executive Officer, Recfishwest
Katherine Sarneckis	Chief Executive Officer, Northern Territory Seafood Council
Colin Shelley	Manager, Commercial Fisheries Development Unit, Fisheries Queensland
Martin Smallridge	Director Fisheries & Aquaculture, Primary Industries, Resources, South Australia
David Smith	CSIRO Marine and Atmospheric Research
Gordon Stone	Corporate Development Institute
Neil Stump	Chief Executive, Tasmanian Seafood Industry Council
Renee Vajtuer	Executive Director, Seafood Industry Victoria
Carlo Vittiglia	Manager, Corporate Communications, Western Australian Department of Fisheries
Brad Warren	Executive Chair, OceanWatch Australia

Government Extension across Industries and Jurisdictions

Attachment 2

Draft – framework w

Industry	NSW	Qld	Vic	SA	WA	Tas	NT
Beef	Mainly retail, cost recovery on training co-investment with MLA, CRC	Free Service /Joint with industry	Co-investment with MLA – wholesale & retail	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	Free service to producers
Cotton	Co-investment with CRDC/CRC cost recovery on training	Free Service /Joint with industry	None	None	None as yet	None	None
Dairy	Co-investment with DA, retail	Free Service /Joint with industry	Co-investment with DA – wholesale & retail	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	None
Fisheries & Aquaculture	Limited, retail, co-investment with industry trust fund	Free Service /Joint with industry		Full cost recovery	Principally a regulatory approach with cost recovery, but also some behavioural change approaches being implemented	Free within regulatory framework	Free service to producers
Forests	Limited, retail, for PNF landholders and operators co-investment with DECCW	Free Service /Joint with industry	Small public good investment, farm forestry – wholesale	Full cost recovery	A range of approaches	Free	Free service to producers
Grains	Mix retail/wholesale co-investment with GRDC	Free Service /Joint with industry	Greater emphasis on wholesaling	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	Free service to producers
Horticulture	Mix retail/wholesale co-investment with HAL	Free Service /Joint with industry	Wholesaling through IDOs	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	Free service to producers
Pork	Mix retail/wholesale	Free Service /Joint with industry	None	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	None	None
Poultry	Wholesale	Free Service /Joint with industry	None	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	None	None
Sheep (meat)	Mainly retail, cost recovery on training co-investment with MLA, CRC	Free Service /Joint with industry	Co-investment with MLA – wholesale & retail	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	None
Sugar	None	Free Service /Joint with industry. (BSES)	None	None	none	None	None
Wine	Mainly retail, cost recovery on training co-investment with GWRDC	Free Service /Joint with industry	Largely wholesaling through IDOs and some practice change research	Full cost recovery. GWRDC, AWRI & WFA provide extension services.	Fit for purpose depending on the desired outcome and/or the service being provided	Gov't sponsored IDO	None
Wool	Mainly retail, cost recovery on training co-investment with AWI, CRC	Free Service /Joint with industry (very strong use of web based technology for engagement & service delivery)	Co-investment with AWI – wholesale & retail	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	None
New and Emerging Industries	Limited, on negotiation	Free Service /Joint with industry	Limited	Full cost recovery	Fit for purpose depending on the desired outcome and/or the service being provided	Project directed co-investment	Free service to producers
Nursery and Ornamental	Web/publications only					None	Free service to producers

Extension Analysis Template

Attachment 3

The request for a Stocktake evolved from two key concepts which arose during the initial meeting:

1. A need to understand how effective current are Extension and Adoption strategies and activities;
2. Realisation that there are several key aspects of Extension and Adoption and that each of these aspects needs to be understood and considered.

An effective extension and adoption strategy will take into account the different aspects of extension and in particular that there are several clear extension pathways associated with research being:

Research/results to:	Direct Clients	Primary target
	Potential clients	Secondary target
	Other Researchers	Tertiary target
	Public	Quaternary target

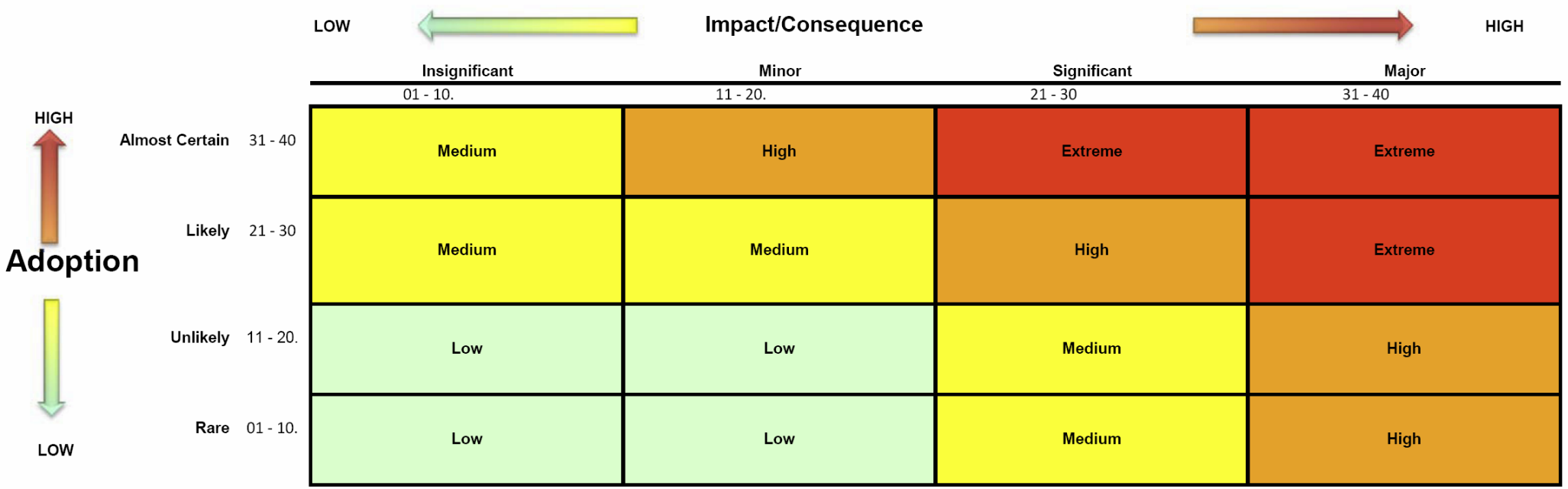
A starting point for assessing our effectiveness in extension is to undertake a Stocktake of how we are performing in each of these areas. Working Group members are to use the Research Planning Template (see Attachment 4) and the perceived effectiveness rating system (next page) as the basis for completing the analysis of each project. Importantly:

- It is noted that responsibility for extension of research results does not necessarily rest with the researcher.
- It is suggested that several key projects are used as case studies to complete the following table with input from a range of stakeholders (ideally drawn from participants at the initial E & A Network meeting).
- Ideally projects will range from specific, single-fishery examples through to issue, whole-of-state or even national projects.
- A key expectation is that the learning's are drawn out from each example. Ideally each team will provide a summary of key learning's from their State based on the case studies they have worked on and their broader experience with and knowledge of research in their State.

Perceived Effectiveness Rating

To assist in getting some consistency between working group members in rating of adoption a matrix that plotted impact/consequence against likelihood was been developed.

Working group members when undertaking assessments should refer to the criteria and the matrix - below.



Adoption Evaluation

Low	Low adoption achieved, activity/research has not been taken up or made little impact
Medium	Moderate adoption achieved, activity/research has been taken up by certain stakeholders and/or has had some impact
High	Significant adoption achieved, activity/research has been taken up by most certain stakeholders and/or has significant impact resulting in change
Extreme	High rates of adoption achieved, activity/research has been widely taken up by most stakeholders and/or has significant impact resulting in change

Project Title: Effectiveness of larger mesh size in reducing the capture of juvenile target species in select NSW beach seine operations
Research Agency: OceanWatch Australia (PI - Michael Wooden)
Client: Industry/Industry and Innovation (I&I) NSW/FRDC

Who was the driver/instigator for the research?	Industry	Government	Researcher	Other:
When was adoption undertaken?	During project	Immed. after	2-5 years after	Other:

Extension Target	Who was responsible?	Tools used?	Performance indicators?	Outcomes	Adoption	Impact	Rating
Primary – NSW ocean hauling fishers	• Researcher. • Ocean Hauling MAC.	• One-on-one interactions (including research being conducted during commercial fishing operations). • 5 min video of methods & results mailed with final report to commercial fishers. • Presentation of results direct to groups of fishers and to Ocean Hauling MAC.	Extent of understanding, acceptance and adoption of the results	• Strong industry support for change. • Adoption of new gear by the relevant fishers.	30	30	High
Primary – NSW fishery managers	The specific researcher	One-on-one meetings with NSW fishery managers	Acceptance of outcomes within management framework	Legislation changed to provide for use of modified gear	40	30	Extreme
Secondary – Other Australian beach seine fisheries	• Researcher • FRDC	• FRDC final report. • Segment on *Fishing with ET*. • 5 min video of methods & results played (loop mode) at national seafood events where OceanWatch represented.	Understanding of implications for results in other fisheries	• Some interest by other haul fishers, including Qld beach haul fishers • Some interest by other NSW non-haul fishers	10	10	Low
Secondary – Other government fisheries agencies	• Researcher • FRDC	• FRDC final report. • Segment on *Fishing with ET*. • 5 min video of methods & results played (loop mode) at national seafood events where OceanWatch represented.	Understanding of implications for results in other fisheries and opportunities for management Participants understand increased environmental benefits and industry initiative	?	?	?	?
Tertiary – Other Fisheries-related researchers/agencies	• Researcher • FRDC	• FRDC final report. • Segment on *Fishing with ET*.	Work referenced in other research projects, reports, etc.	Awareness of research and results within scientific community	15	15	Low
Quaternary – general public (particularly in NSW)	• Researcher • FRDC	• Segment on *Fishing with ET*. • Presentations/video display at seafood festivals and NSW Central Coast Marine Discovery Centre. • Short promotional video about beach haul selectivity placed on internet – YouTube and Facebook – eg. www.youtube.com/watch?v=JSeNZDLQH6E	Improved image/perception of commercial fishing, particularly beach hauling	• Awareness of research and results within scientific community • Positive feedback received during community presentations	25	15	Medium

Key Learning's:
- Strong industry involvement through the project – from concept, to participation in methods, to informing fishers/MAC and fishery managers.
- Strong industry support for and confidence in the results and expeditious implementation assisted in getting necessary legislation changed made.

Project Title: Maximising survival of released undersize west coast reef fish. FRDC Project 2000/194
Research Agency: Department of Fisheries Western Australia
Client:

Who was the driver/instigator for the research?	Industry	Government	Researcher	Other:
When was adoption undertaken?	During project	Immed. after	2-5 years after	Other:

Extension Target	Who was responsible?	Tools used?	Performance indicators?	Outcomes	Adoption	Impact	Rating
Primary – Recreational fishing sector in general	The Principal Investigator The peak recreational body - Recfishwest	- Public meetings and information sessions throughout project and after completion. - Cooperative tagging project involving recreational fishing volunteers. - General print media targeted at recreational fishers providing project updates. - Production of specific brochures and a DVD.	Extent of understanding, acceptance and adoption of the results and proven methods. Level of volunteer participation and numbers of fish tagged.	Large increase in awareness of post release survival issues and adoption of release weight device.	25	25	High
Secondary – West Australian government (fishery managers)	The Principal Investigator The peak recreational body - Recfishwest	Meetings with fishery managers and invitation to public information sessions. Final Report Discussions with stakeholders	Acceptance of outcomes within management framework.	Legislation of release weight device on West Coast zone for commercial and recreational sectors. Introduction of material into government extension materials.	25	35	Extreme
Secondary – Stakeholders in other states	Researcher/FRDC	National strategy – released fish survival	Extent of awareness of appropriate methods.	Introduction into education awareness programs	10	15	Medium
Tertiary – Other Fisheries-related researchers/agencies	Researcher	Publication of results Final Report		Awareness of research and results within scientific community	15	15	Medium
Quaternary – general public (particularly in Western Australia)	The specific researcher and the Department of Fisheries	Government fisheries journal.			5	5	Low

Key Learning's:

- Involvement of peak body as a collaborative partner in components of research project greatly aided in stakeholder engagement though factors such as promotion of research outputs and development of appropriate extension materials.
- Direct involvement of fishers in data collection leads to a greater understanding of results, greater uptake of outcomes and increased fishery stewardship in general.
- Extension focussed on decision-makers can lead to high adoption through changes to legislation when supported by industry.
- In the case of this project, targeting stakeholders in other states was greatly facilitated by a national extension strategy. (Release Fish Survival Strategy).

Project Title: FRDC: 2010/302 – Equipping the mud crab industry with innovative skills through extension of best practice handling
Research Agency: Innovative Food Technologies, DEEDI, QLD
Client: Australian mud crab supply chain

Who was the driver/instigator for the research?	Industry	Government	Researcher	Other:
When was adoption undertaken?	During project			Other:

Extension Target	Who was responsible?	Tools used?	Performance indicators?	Outcomes	Adoption	Impact	Rating
Commercial mud crab fishers	Researchers Chairs of Associations	Stories pitched to industry publications Face to face communications Demonstrations or presentations at industry events Forums	case studies interviews improved economic return market data feedback participant numbers adoption level	information delivered to > 80% of supply chain at least 50% of industry adopted handling recommendations	32	36	Extreme
Wholesalers and retailers	Researchers Lead industry stakeholders	Stories pitched to industry publications Face to face communications Demonstrations or presentations at industry events Forums Point of purchase materials	case studies interviews improved economic return market data feedback participant numbers adoption level	information delivered to > 80% of supply chain at least 50% of industry adopted handling recommendations	28	40	Extreme
Market distributers	Researchers	Stories pitched to industry publications Face to face communications Demonstrations or presentations at industry events, Forums	case studies interviews improved economic return market data feedback participant numbers adoption level	information delivered to > 80% of supply chain at least 50% of industry adopted handling recommendations	25	36	Extreme
Industry associations	Researchers Chairs of Associations	Stories pitched to industry publications Face to face communications Demonstrations or presentations at industry events Forums	feedback participant numbers	information delivered to > 80% of supply chain at least 50% of industry adopted handling recommendations	21	18	Medium
Hospitality	Researchers	Stories pitched to industry publications Face to face communications Demonstrations or presentations at industry events Forums Point of purchase materials	case studies interviews improved economic return market data feedback participant numbers adoption level	information delivered to > 80% of supply chain at least 50% of industry adopted handling recommendations	17	11	Medium
Consumers	Researchers	Stories pitched to industry publications Point of purchase materials	case studies interviews market data, and feedback	satisfied customers return purchases	10	5	Low

Key Learnings:

- Actual mortality rates and how these relate to different environmental conditions and handling practices,
- Actual mortality rates and how this relates to economic data such as lost/potential income,
- Simple physiological information on what happens when crabs are out of the water and the effect of holding times and storage conditions,
- How handling practices contribute to stress factors,
- Key handling methods at critical points to minimise stress levels,
- How to differentiate product on brand messages of quality and best practice,

- How different agents in the supply chain can communicate best practice handling and storage practices to others in the supply chain.

Issue or Project Title: Introduction of By-catch Reduction Gear in the Gulf St Vincent Prawn Fishery in South Australia
Research Agency: South Australian Research and Development Institute
Client: Gulf St Vincent Prawn Fishers Association

Who was the driver/instigator for the research?	Industry	Government	Researcher	Other:
When was adoption undertaken?	During project	Immed. after	2-5 years after	Other:

Extension Target	Who was responsible?	Tools used?	Performance indicators?	Outcomes	Adoption	Impact	Rating
Primary – GSV Prawn Fishers Association	The specific researcher The Executive Officer of the Association	One-on-one interactions (including research being conducted on commercial vessels) Association meetings	Extent of understanding, acceptance and adoption of the results	100% adoption of new gear	36	25	Extreme
Secondary – South Australian government (fishery managers),	The specific researcher The Executive Officer of the Association	Ad hoc one-on-one meetings with SA fishery manager	Acceptance of outcomes within management framework Participants understand increased environmental benefits and industry initiative	Legislation of new gear requirements in South Australia Introduction into education awareness programs	25	25	High
Secondary – Other Australian Prawn Fisheries	Researcher/FRDC	FRDC Fish Magazine and final report	Understanding of implications for results in other fisheries	Some interest by other fishers	10	10	Low
Secondary – Other government fisheries agencies	Researcher/FRDC	FRDC Fish Magazine and final report	Understanding of implications for results in other fisheries and opportunities for management Participants understand increased environmental benefits and industry initiative	Introduction into education awareness programs	10	15	Medium
Tertiary – Other Fisheries-related researchers/agencies	Researcher	Publication of results (final report, presentation at conferences and publication in scientific literature		Awareness of research and results within scientific community	15	15	Medium
Quaternary – general public (particularly in South Australia)	The specific researcher The Executive Officer of the Association	Media release	Community understands the work that was done and the positive outcomes for the environment		10	10	Low

Key Learning's:

Involving direct beneficiaries in the research process provides for best extension and adoption outcomes.
Roles and responsibilities not matched to capabilities.
Not intentional about all levels of extension with a focus on the primary pathway.

Attachment 4 – Research Planning Template

Issue or Project Title:
Research Agency:
Client:

Who was the driver/instigator for the research?	Industry	Government	Researcher	Other:
When was adoption undertaken?	During project	Immed. after	2-5 years after	Other:

Target Audience

Extension Target	Who was responsible?	Tools used?	Performance indicators?	Outcomes	Adoption	Impact	Rating
Primary –							
Secondary –							
Secondary –							
Secondary –							
Tertiary –							
Quaternary –							

Key Learning's:

THE NATIONAL FISHING AND AQUACULTURE

EXTENSION AND ADOPTION STRATEGY

A component of ***Working Together: the National Fishing and Aquaculture RD&E Strategy 2010***

Draft 11 – 27 March 2012